

SARGENT (D.A.)

HANDBOOK

OF

DEVELOPING EXERCISES.

BY

DUDLEY A. SARGENT, M.D.,

DIRECTOR HEMENWAY GYMNASIUM, HARVARD UNIVERSITY,
CAMBRIDGE, MASS.



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HANDBOOK

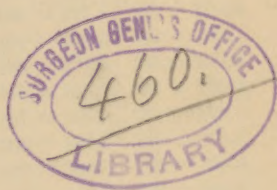
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TABLES

FOR EASILY CHANGING FROM METRIC TO ENGLISH THE
WEIGHTS AND MEASUREMENTS CONTAINED IN THE
HANDBOOK OF DEVELOPING EXERCISES BY
DUDLEY A. SARGENT, M.D.

Kilograms are made equivalent to the nearest Tenths of Pounds.
1 Kilogram = 2.20462 Pounds.

Kilos.	Lbs.	Kilos.	Lbs.	Kilos.	Lbs.	Kilos.	Lbs.	Kilos.	Lbs.
1 =	2.2	31 =	68.3	61 =	134.5	91 =	200.6	121 =	266.8
2 =	4.4	32 =	70.5	62 =	136.7	92 =	202.8	122 =	269.0
3 =	6.6	33 =	72.8	63 =	138.9	93 =	205.0	123 =	271.2
4 =	8.8	34 =	75.0	64 =	141.1	94 =	207.2	124 =	273.4
5 =	11.0	35 =	77.2	65 =	143.3	95 =	209.4	125 =	275.6
6 =	13.2	36 =	79.4	66 =	145.5	96 =	211.6	126 =	277.8
7 =	15.4	37 =	81.6	67 =	147.7	97 =	213.8	127 =	280.0
8 =	17.6	38 =	83.8	68 =	149.9	98 =	216.1	128 =	282.2
9 =	19.8	39 =	86.0	69 =	152.1	99 =	218.3	129 =	284.4
10 =	22.0	40 =	88.2	70 =	154.3	100 =	220.5	130 =	286.6
11 =	24.3	41 =	90.4	71 =	156.5	101 =	222.7	131 =	288.8
12 =	26.5	42 =	92.6	72 =	158.7	102 =	224.9	132 =	291.0
13 =	28.7	43 =	94.8	73 =	160.9	103 =	227.1	133 =	293.2
14 =	30.9	44 =	97.0	74 =	163.1	104 =	229.3	134 =	295.4
15 =	33.1	45 =	99.2	75 =	165.3	105 =	231.5	135 =	297.6
16 =	35.3	46 =	101.4	76 =	167.6	106 =	233.7	136 =	299.8
17 =	37.5	47 =	103.6	77 =	169.8	107 =	235.9	137 =	302.0
18 =	39.7	48 =	105.8	78 =	172.0	108 =	238.1	138 =	304.2
19 =	41.9	49 =	108.0	79 =	174.2	109 =	240.3	139 =	306.4
20 =	44.1	50 =	110.2	80 =	176.4	110 =	242.5	140 =	308.6
21 =	46.3	51 =	112.4	81 =	178.6	111 =	244.7	141 =	310.9
22 =	48.5	52 =	114.6	82 =	180.8	112 =	246.9	142 =	313.1
23 =	50.7	53 =	116.8	83 =	183.0	113 =	249.1	143 =	315.3
24 =	52.9	54 =	119.0	84 =	185.2	114 =	251.3	144 =	317.5
25 =	55.1	55 =	121.3	85 =	187.4	115 =	253.5	145 =	319.7
26 =	57.3	56 =	123.5	86 =	189.6	116 =	255.7	146 =	321.9
27 =	59.5	57 =	125.7	87 =	191.8	117 =	257.9	147 =	324.1
28 =	61.7	58 =	127.9	88 =	194.0	118 =	260.1	148 =	326.3
29 =	63.9	59 =	130.1	89 =	196.2	119 =	262.3	149 =	328.5
30 =	66.1	60 =	132.3	90 =	198.4	120 =	264.6	150 =	330.7

AVERAGE.					EXAMINATION.			
Age.	Weight.	Height.	Chest.		First.	Second.	Third.	Fourth.
				No.				
				Age, last birthday,				
				Weight, without clothes,				
				Height, standing,				
				Height, sitting,				
				Head girth,				
				Neck girth,				
				Chest girth, natural,				
				Chest girth, inflated,				
				Waist girth, natural,				
				Thigh girth, right,				
				Thigh girth, left,				
				Knee girth, right,				
				Knee girth, left,				
				Calf girth, right,				
				Calf girth, left,				
				Upper-arm girth, right,				
				Upper-arm girth, left,				
				Fore-arm girth, right,				
				Fore-arm girth, left,				
				Wrist girth, right,				
				Wrist girth, left,				
				Stretch of arms,				
				Strength,				
				Back,				
				Legs,				
				Chest,				
				Arms,				
				Lungs,				

PHYSICAL EXAMINATION.

	First.	Average.	Second.	Average.	Increase.	Third.	Average.	Increase.	Fourth.	Average.	Increase.	TOTAL.
DEVELOPMENT . .												
STRENGTH												
CONDITION . . .												
IMPROVEMENT . .												

Where the averages are not given, the number of observations has not been large enough to make the result reliable, and the comparative standing of the individual is designated by (A) or (B); meaning that the development or strength of such individual, as a whole or in any part, is either *above* or *below* the average development and strength of corresponding parts in men of his age.

Centimeters are made equivalent to the nearest Tenths of Inches.

1 Centimeter = .39371 Inches.

Cents. Inches.	Cents. Inches.	Cents. Inches.	Cents. Inches.	Cents. Inches.
1 = 0.4	41 = 16.1	81 = 31.9	121 = 47.6	161 = 63.4
2 = 0.8	42 = 16.5	82 = 32.3	122 = 48.0	162 = 63.8
3 = 1.2	43 = 16.9	83 = 32.7	123 = 48.4	163 = 64.2
4 = 1.6	44 = 17.3	84 = 33.1	124 = 48.8	164 = 64.6
5 = 2.0	45 = 17.7	85 = 33.5	125 = 49.2	165 = 65.0
6 = 2.4	46 = 18.1	86 = 33.9	126 = 49.6	166 = 65.4
7 = 2.8	47 = 18.5	87 = 34.3	127 = 50.0	167 = 65.7
8 = 3.1	48 = 18.9	88 = 34.6	128 = 50.4	168 = 66.1
9 = 3.5	49 = 19.3	89 = 35.0	129 = 50.8	169 = 66.5
10 = 3.9	50 = 19.7	90 = 35.4	130 = 51.2	170 = 66.9
11 = 4.3	51 = 20.1	91 = 35.8	131 = 51.6	171 = 67.3
12 = 4.7	52 = 20.5	92 = 36.2	132 = 52.0	172 = 67.7
13 = 5.1	53 = 20.9	93 = 36.6	133 = 52.4	173 = 68.1
14 = 5.5	54 = 21.3	94 = 37.0	134 = 52.8	174 = 68.5
15 = 5.9	55 = 21.7	95 = 37.4	135 = 53.2	175 = 68.9
16 = 6.3	56 = 22.0	96 = 37.8	136 = 53.5	176 = 69.3
17 = 6.7	57 = 22.4	97 = 38.2	137 = 53.9	177 = 69.7
18 = 7.1	58 = 22.8	98 = 38.6	138 = 54.3	178 = 70.1
19 = 7.5	59 = 23.2	99 = 39.0	139 = 54.7	179 = 70.5
20 = 7.9	60 = 23.6	100 = 39.4	140 = 55.1	180 = 70.9
21 = 8.3	61 = 24.0	101 = 39.8	141 = 55.5	181 = 71.3
22 = 8.7	62 = 24.4	102 = 40.2	142 = 55.9	182 = 71.7
23 = 9.1	63 = 24.8	103 = 40.6	143 = 56.3	183 = 72.0
24 = 9.4	64 = 25.2	104 = 40.9	144 = 56.7	184 = 72.4
25 = 9.8	65 = 25.6	105 = 41.3	145 = 57.1	185 = 72.8
26 = 10.2	66 = 26.0	106 = 41.7	146 = 57.5	186 = 73.2
27 = 10.6	67 = 26.4	107 = 42.1	147 = 57.9	187 = 73.6
28 = 11.0	68 = 26.8	108 = 42.5	148 = 58.3	188 = 74.0
29 = 11.4	69 = 27.2	109 = 42.9	149 = 58.7	189 = 74.4
30 = 11.8	70 = 27.6	110 = 43.3	150 = 59.1	190 = 74.8
31 = 12.2	71 = 28.0	111 = 43.7	151 = 59.5	191 = 75.2
32 = 12.6	72 = 28.3	112 = 44.1	152 = 59.8	192 = 75.6
33 = 13.0	73 = 28.7	113 = 44.5	153 = 60.2	193 = 76.0
34 = 13.4	74 = 29.1	114 = 44.9	154 = 60.6	194 = 76.4
35 = 13.8	75 = 29.5	115 = 45.3	155 = 61.0	195 = 76.8
36 = 14.2	76 = 29.9	116 = 45.7	156 = 61.4	196 = 77.2
37 = 14.6	77 = 30.3	117 = 46.1	157 = 61.8	197 = 77.6
38 = 15.0	78 = 30.7	118 = 46.5	158 = 62.2	198 = 78.0
39 = 15.4	79 = 31.1	119 = 46.9	159 = 62.6	199 = 78.3
40 = 15.7	80 = 31.5	120 = 47.2	160 = 63.0	200 = 78.7

PREFACE.

THE present handbook is intended to be used in connection with the system of physical examinations adopted at Harvard University. By means of these examinations the physical condition of the individual is accurately ascertained. The relative proportions of the different parts of the body; the undue development of certain muscles, and the relaxed and enfeebled condition of others; the comparative size of body and limbs; variations of height, breadth, weight, and muscular strength, from the normal standard for a given age, — must all be taken into account in prescribing any useful course of physical training. This information, together with a variety of facts concerning personal history, bone and muscle measurements, and acquired or inherited tendencies to chronic or functional disease, shows at once the immediate needs of the person under advice. This book will serve as a substitute for the prescription cards heretofore employed, and will act as a more specific guide to the use of the new system of apparatus. Its intelligent application to personal needs depends entirely upon a thorough physical examination; and, when the condition of the individual has been thus ascertained, the necessary

apparatus will be marked, and the weight, the number of times, and the rate of movement, will be clearly indicated.

The brief remarks on exercise, diet, air, sleep, and kindred subjects, are supplemented by a course of lectures.

While primarily intended, as we have said, for use in Harvard University, this manual will, of course, be equally serviceable in institutions and individual cases where the same system of examinations and apparatus is employed.

The present treatise forms the first of a series which will include special works on gymnastics and athletics.

D. A. S.

EXERCISE, General.

WHEN the muscles have been for a long time inactive, begin with light movements, and continue exercise for fifteen or twenty minutes only the first day. Increase the time and amount gradually, never reaching a maximum until nearly through training. Leave off exercise as gently as you begin. Never try to do your best in running, jumping, etc., or at feats of strength, until thoroughly warmed and limbered up. Do not exercise within two hours after eating, nor within a half-hour before.

If much heated and fatigued, a gentle rubbing-down will tend to keep up the surface circulation, and prevent taking cold.

EXERCISE, Special.

A. Exercise between four and six P.M. daily.

B. Take no exercise before breakfast. Exercise between nine and ten P.M., if convenient.

C. Exercise between eleven A.M. and one P.M.

D. Exercise slowly and deliberately, and take frequent intervals of rest. Do not run, row, ride horse-back, or play lawn-tennis.

E. Exercise vigorously, fill the lungs frequently, and do not rest until the allotted task is finished.

F. Reduce exercise one-half during examinations, or while doing an unusual amount of brain-work.

G. When subjected to unusual mental or emotional excitement, increase the time and amount of exercise, using chiefly the muscles of the lower extremities.

DIET, General.

As a general rule eat whatever you crave, unless your appetite has been stimulated by condiments, or malt and alcoholic liquors. Have your meals come at least five hours apart.

If you take supper at six p.m., do not hesitate to eat lightly after eleven p.m. if you feel hungry. When very thirsty, rinse the mouth, and take a few swallows of water. After waiting for fifteen minutes, if still thirsty, drink all you want.

DIET, Special.

A. Dine between six and eight p.m.

B. Dine between twelve and one p.m.

C. Do not breakfast before seven a.m.

D. Avoid cucumbers, lobster, and beans, and baked-potato peelings.

E. Never use vinegar or lemon-juice at any meal with milk or preserves. Do not eat sugar, except with food.

F. Drink neither tea, coffee, milk, nor lager-beer.

G. Avoid oat and rye meal, apple-sauce, onions, prunes, pears, and peaches. Drink tea and coffee freely.

H. Abstain from bread, butter, sugar, milk, pork, veal, salmon, beets, and turnips. Use no malt or alcoholic liquor of any kind, except very light wines.

I. Eat oat or rye meal every morning, and all kinds of fruit in their season. Drink one to three glasses of water every night before retiring.

J. Eat four or five times a day at regular intervals: take the hearty meal at noon.

SLEEP.

A. Get eight hours of unbroken sleep. Use hair mattress and net wire-spring bed. Sleep under as few clothes as possible.

B. Nine hours' sleep better than eight. Raise head of bed slightly, and do away with slat spring bed. Do not study after nine P.M. Bathe the feet in cold water, eat a cracker, and drink a glass of water, just before retiring.

C. Go to bed at ten, and rise on waking. Sleep on a hard bed. Have no flannel next to the skin, and as few clothes on bed as possible. Avoid drinking after seven P.M. Take gentle but prolonged exercise for an hour or two before retiring. Give up society for three months.

D. Do not sleep with arms above head, or with clothes folded over chest. Wrap an extra blanket or shawl around shoulders and chest in cold weather.

E. Do not sleep in the daytime, unless deprived of the regular sleep at night.

AIR.

A. Keep a window open day and night when the weather is not cold enough for a fire. In cold weather ventilate room by opening the windows from half an inch to two inches at top and bottom. Have an open fireplace if possible.

B. Keep room at an even temperature. After sitting in a warm, close room during the day, do not sleep with open windows in your bedroom at night. A temperature of 65° F. is warm enough for winter.

C. In riding or exercising in the open air in winter, keep the mouth closed, and breathe through the nose. In running in open air in very cold weather, cover the mouth and nose with a thin veil. After running or riding in very cold air, do not go immediately into a warm room. Do not talk in cold air after having been in a warm room.

D. Spend your vacation in a mountainous region as far inland as possible.

E. Live as near the seashore as possible, and take every opportunity to be upon the water.

F. Spend the summer months in some inland valley in preference to the mountains or the seashore.

BATHING.

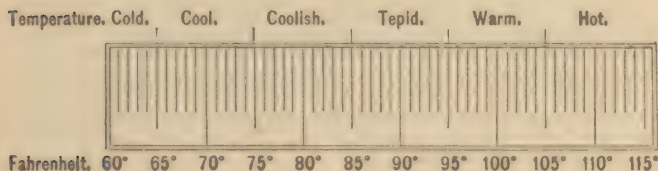
A. Take a tepid sponge-bath after exercise, while standing, and a warm tub-bath twice a week.

B. Take a cool sponge-bath after exercise, while standing: use no soap with cool bath, but rub down vigorously with Turkish towel. Take a warm tub-bath twice a week just before retiring, and use white castile soap profusely.

C. Take no bath after exercise, but rub down with dry towel. Omit cold bath in the morning. Take a warm shower-bath three times a week, followed immediately by a few seconds' exposure to a cool shower, and a vigorous rubbing.

D. Avoid hot and cold baths at all times. Never bathe immediately after exercise, especially if tired.

E. Take a warm sponge-bath daily, while standing, followed by a cool shower. Use no rough wash-cloths, hair gloves, or scrubbing-brushes. Apply soap freely with the hands, and wipe *gently* dry with fine linen towels.



CLOTHING.

A. Wear dark clothes in winter, and light in summer. Have three changes of underclothing, — heavy flannels for winter, light flannels for spring and fall, lisle-thread, silk, or open cotton for summer. Avoid wearing overcoats, rubbers, and comforters when possible.

B. Outer garments same as in **A.** Do not wear flannel or silk underclothing at any time, but wear twilled cotton instead. Dress warmly when you go out, but avoid getting into a perspiration. Do not wear rubbers, chest-protectors, or comforters. Do not wear rubber garments.

C. Wear flannels day and night throughout the year. Wear rubbers or overshoes when exposed to water or snow. Change clothing often, and increase the amount with falling temperature.

D. Change clothing when exercising. Let exercising-garments be less in number, but of same material, as those usually worn. Cover the entire person, arms as well as legs. Use no garters.

E. Wear no colored underclothing or hosiery. If you wear a Jersey, put on a thin flannel under it.

F. Do not wear clothing tightly buttoned around chest or abdomen. Wear suspenders at all times, except when sleeping or exercising.

RUNNING-TRACK.

(19 laps to a mile.)

A. Walk one lap, gently increasing the speed on the second lap, until you walk into a run; run four laps to the left, then four to the right; and settle into a walk again.

B. Start on a steady run at slow speed, and keep it up, without varying the gait, for twenty-four laps, running twelve laps each way.

C. Run two laps on the toes each way, then hop twice on one foot and twice on the other, alternately, for two laps each way. Finish with a moderate walk of three laps.

D. Begin with a walk of one or two laps; then settle into a run of moderate speed, and keep it up for twenty laps, putting on maximum speed at the fifteenth lap, and gradually slowing down after that to a walk on the twenty-first, which it will be desirable to continue for four laps or more. Reverse regularly the order of running.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 laps.

Movement. — Very slow, slow, medium, fast, very fast.

DIRECTIONS FOR USING THE CHEST-WEIGHTS.

Grasp the handles, and stand far enough away from the apparatus to just clear the boxes from the rubber buffers before commencing the movement.

Keep the ropes straight, pull steadily, and do not allow the boxes to strike at the top or bottom.

The pulleys are placed shoulder-high in order that a greater variety of movements may be executed.

If one foot is placed before or behind the other for a brace, change the position frequently: otherwise the development will be one-sided.

In the second course the movements are for the most part carried through short spaces.

If the boxes strike at the top, step forward a little; if at the bottom, step backward.

Stand with feet together while executing the forward and backward movements.

FIRST COURSE ON THE CHEST-WEIGHTS.

Weight.—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.

Times.—5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement.—Very slow, slow, medium, fast, very fast.

Rate per minute.—25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125.

POSITION.

No. 1.—Face the boxes, head erect, shoulders back, feet together, arms extended forward, palms in, handles perpendicular.

No. 2.—Body straight; resist any tendency to bend forward; palms down, handles horizontal.

No. 3.—Body bent back, chin held high; hold elbows shoulder-high; palms up, handles horizontal.

No. 4.—Step fourteen inches nearer boxes with left foot; at same time place right handle underneath left handle, into fingers of left hand; grasp left handle with right hand; turn to right, bringing feet together, and back to boxes; palms in, handles perpendicular, top of handle level with top of shoulder.

No. 5.—Step directly forward with left foot, eighteen inches; arms extended downward and backward, with palms forward; handles horizontal.

MOVEMENT.

Pull straight back till handle nearly touches shoulder, left and right alternately, beginning with left.

Right and left alternately; begin with left; bring arm straight down at side, handle just passing the thigh.

Left and right alternately, left first; bend arm to shoulder, carrying handles over.

Together, extend arms straight forward, shoulder-high, keeping back and legs stiff, and chest thrown well to the front.

Together, forward till handles just pass thighs; keep arms straight, and head and shoulders well thrown back.

No. 6.—Step toward boxes twelve inches with right foot; at same time swing arms out at side; bring handles over shoulders, back of head, palms inward, handles perpendicular.

No. 7.—Step forward two feet with the right foot, at same time placing right handle on right hip, palm in, and left hand horizontal, palm down, arm extended.

No. 8.—Reverse position in No. 7; turn to right.

No. 9.—Right arm, as before; pass left handle behind back and by the body, palms up, handle horizontal.

No. 10.—Reverse position of No. 9, and turn to left.

No. 11.—Turn to right; right side to boxes, right hand at side, palm in, handle horizontal; left hand behind head, handle perpendicular, palm in.

No. 12.—Reverse position of No. 11; turn to left.

No. 13.—Turn to right; at same time bring right handle down, placing left handle into fingers of right hand; when right side is turned to boxes, change handles, right arm extended and palm down, handle horizontal; left arm across body, palm in, handle perpendicular.

No. 14.—Turn to right, reversing position in No. 13.

No. 15.—Turn to left; face boxes, palms downward, handles horizontal.

Together, directly forward, elbows shoulder-high, handles horizontal, and palms forward. Resist tendency to bend back.

Left hand; bring arm straight down to side.

Right hand; bring arm straight down to side.

Left hand; extend the arm six inches beyond left thigh, straightening it as it passes outward.

Right hand; movement as in No. 9.

Left hand; extend hand straight out, shoulder-high; bring palm downward, handle horizontal.

Right hand; movement as in No. 11.

Left hand; elbows shoulder-high; extend across chest.

Right hand; movement as in No. 13.

Together, bring to knees, arms straight, bending forward; turn palms upward; bring hands in a curve over shoulders, straightening the body.

SECOND COURSE ON CHEST-WEIGHTS.

Unless otherwise indicated, both hands move together in the following exercises.

Weight. — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130.

POSITION.

No. 1. — Face the boxes; grasp the handles, with palms downward.

No. 2. — Face the boxes; turn the right handle, with palm upward, left remaining with palm downward.

No. 3. — Face the boxes; turn the left handle with palm upward, right with palm downward.

No. 4. — Stand with left side to boxes; hold the left hand with palm downward, right hand with palm inward.

No. 5. — Stand with right side to boxes; hold the right hand with palm downward, left hand with palm inward.

MOVEMENT.

Bring both handles back to shoulders, bending elbows outward.

Press downward with left arm, keeping it straight, and upward with right arm, bending it as little as possible.

Press downward with right arm, keeping it straight, and upward with the left, bending it as little as possible.

Bring left arm down to side, keeping it straight; carry right arm across the body, bending the elbow, with handle held perpendicular, about the height of the chin.

Bring right arm down to side, keeping it straight; carry left arm across the body, bending the elbow, with handle held perpendicular, about the height of the chin.

No. 6.—Grasp right handle with left hand, and left handle with right hand; stand with left side to boxes; right hand behind the head, and palm inward; left hand waist-high, in front of body, with palm downward.

No. 7.—Stand with right side to boxes, left hand behind the head, and palm inward; right hand waist-high, in front of body, with palm downward.

No. 8.—Stand with left side to boxes, holding the handle with right hand, palm upward, waist-high, behind the back; left hand in front of chest, with palm turned inward.

No. 9.—Stand with right side to boxes, holding the handle with left hand, palm upward, waist-high, behind the back; right hand in front of chest, with palm turned inward.

No. 10.—Stand with back to boxes, holding the hands extended behind the body, with palms upward, and body bending slightly forward.

No. 11.—Stand with back to boxes; right arm bent sharply back over shoulder, with palm upward; left arm extended downward and backward, with palm forward, and handle level with the hip.

Carry right arm straight out to its full extent, turning handle to horizontal position; carry the left hand diagonally downward across the body.

Carry left hand straight out to its full extent, turning handle to horizontal position; carry right hand diagonally downward across the body.

Draw right arm across the back, straightening the elbow as it moves; carry left hand diagonally upward across the face.

Draw left arm across the back, straightening the elbow as it moves; carry right hand diagonally upward across the face.

Bring the handles forward until they pass the body, the ropes moving under the arms, turning the palms inward, and straightening the body.

Move both hands directly forward, at the same time straightening the elbows.

No. 12.— Back to boxes; left arm bent sharply back over shoulder, with palm upward; right arm extended downward and backward, with palm forward, and handle level with the hip.

No. 13.— Pass the right handle over the head, at the same time turning so as to stand with left side to boxes; then transfer left handle to left hand, and right handle to right hand; hold both handles chest-high, in front of body.

No. 14.— Without changing handles, stand with right side to boxes; hold both handles vertical, chest-high, in front of the body, with palms inward.

No. 15.— Face the boxes, with arms extended straight forward, holding the handles horizontally, with palms downward.

Move both hands directly forward, at the same time straightening the elbows.

Draw the right hand upward and outward at some distance from the body; as the right hand returns, push the left hand across the body, the handle passing under the right arm. In the next movement the right hand moves downward, and the left hand passes over the right arm.

Draw the left hand upward and outward at some distance from the body; as the left hand returns, push the right hand across the body, the handle passing under left arm. In next movement left hand moves downward, and the right hand passes over left arm.

Press down with handles, keeping arms straight, and bending at the hips till the handles nearly touch the knees. Come to erect position, and bring handles to shoulders. Return to original position, and then bring handles high above the shoulders, keeping arms straight, and bending body slightly backward.

Numbers 2 and 51.

A. Face the apparatus. Grasp the vertical rods shoulder-high; stand with feet twelve inches from bottom piece; place the left foot upon the treadle, allowing only the hollow of the foot to touch; lean slightly forward, and bring the treadle down on the rubber buffers, the right foot remaining in position.

A'. The same, with right foot on the treadle.

B. Face the apparatus. Step with left foot on the treadle, then with right, bringing both treadles on buffers; grasp the horizontal rods about six inches from the vertical rods; while in this position, with body held erect, raise the left knee to a horizontal in front; then bring the treadle again to the buffers.

B'. The same with the right foot, alternating, and coming to rest between each movement.

C. Grasp the handles over head, hold the weight with bent arms, and work the treadles, alternating right and left.

D. Grasp the horizontal rods about twelve inches from the vertical rods; support the weight partly by the hands, and allow both knees to ascend, bending the back at the same time; then straighten both legs, and bring the treadles to buffers.

Weight. — 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Times. — 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.



Numbers 3 and 50.

A. Face the apparatus. Place bridle on the head; grasp the vertical rods shoulder-high; step back till the arms are extended, and toes are within twelve inches of the plates around foot of rods; come forward, keeping the neck and body rigidly straight, rising on the toes lightly; then push back to position.

B. Face the apparatus. Place the bridle on the head; grasp the rods shoulder-high, and step back until the toes are on a line with the foot of vertical rods; lean backward till arms are extended; then come forward with the head, bending neck, upper and lower back, pivoting at the hips; now straighten the back and neck, throwing the chest well forward with every movement.

C. Face the apparatus. Place the bridle on the head; step back till the body is parallel with the vertical bars; grasp the bars shoulder-high; allow the neck to drop forward, pivoting at the seventh cervical vertebra, extending the chin well forward; bring head back to place, straightening the neck, etc.

D. Stand with left side to apparatus. Place bridle on head; grasp the bridle-yoke with the left hand; step to the right till the body is just outside the line of the vertical rods, with feet twenty-four inches apart; with left leg firmly braced, lean to the left till the head passes the vertical bar, then swing to the right.

D'. The same, with right side to apparatus, swinging the head to the left.

E. Arrange the bridle for the floor-pulley. Place the bridle on the head, grasping the rods at the sides; step back until the toes are on a line with the foot of rods; bend forward, keeping the back and neck rigidly straight, pivoting at the hips only; bring body to the upright position.

Weight. — 5, 7½, 10, 12½, 15, 17½, 20, 22½, 25, 27½, 30.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 15, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Number 4.

A. Step into the stall. Place left foot in the stirrup, grasp the horizontal rods six inches from the vertical rods, step back with right foot till on a line with vertical rods; with knee slightly bent, and toes pointed downward, bring the foot down in pawing movement until the toes nearly touch the floor; bend the knee sharply, bringing the heel toward the buttock; then extend the leg forward, and continue as before.

A'. The same as above, with right foot in the stirrup.

B. Place the left foot in the stirrup, and turn left side to the apparatus. Grasp the horizontal rod with the left hand, and the vertical rod with the right hand, letting the right foot remain about twelve inches from foot of vertical rod; while in this position, bring the left foot down within ten inches of the right heel, keeping the left leg as straight as possible.

B'. The same as above, with right leg, and with right foot in stirrup.

C. Step inside the stall. Place left foot in the stirrup; grasp the horizontal rods twelve inches from the wall, and stand with right foot eighteen inches from weight-box; lean backward till arms and right leg are extended; then bring left knee to a horizontal position in front of body; straighten left leg, and repeat the movement.

C'. The same as above, with right leg, and with right foot in stirrup.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20.

Times. — 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Numbers 5 and 49.

A. Place yourself between the bars, with back to the weight-box. Grasp the handles, with thumbs outside, about five inches from the end, with head erect, chest forward, shoulders back, and elbows extended at the sides diagonally backward; push the bars downward until the arms are extended.

In this exercise care should be taken not to let the head drop forward, or the elbows to extend too far backward. To avoid this tendency keep the hands on the bars slightly in front of the body.

B. Place yourself between the bars, with back to weight-box. Position of the hands, just in front of the body, with thumbs on the outside of bars. Push the bars downward; now allow them slowly to rise, inflating the lungs fully at the same time; while holding the breath, push the bars down vigorously, exhale, and continue the movement as described.

Weight. — 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 15, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Rest minutes after each movement (after 2, 4, 6, 8, 10 movements), in reclining posture, before using any other apparatus.

Number 6.

A Place your feet on the foot-rest, with heels against the cleat; with feet in this position, slide down the platform until you can grasp the handles; then extend the legs, lifting the back free from the platform, and throwing the weight of the body upon the shoulders; while in this position, let the platform slide down to the buffers; extend the legs vigorously, slide back slowly, and repeat.

B. Take a sitting position on the platform, with balls of the feet placed on the cleat, with toes very near the middle of foot-rest. Slide down until you can grasp the handles; now extend the legs vigorously; allow the platform to slide within three or four inches of the buffers, and continue extending and flexing the legs.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Rest *minutes* after each movement (after 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Number 7.

A. Adjust the apparatus so that the top of the shoulder-pads are on a level with the arm-pits, and about seven inches apart; place the pads on the shoulders, standing with back to the railing, knees bent outward, and body erect; grasp the vertical irons above the shoulders, with thumbs downward; take a full breath; raise the weight until the legs are completely extended; then lower it gradually, take another full breath, and continue as before.

B. Adjust the apparatus so that the shoulder-pads will fall upon the top of the shoulders toward the outer edge; stand with back to the railing, with knees slightly bent; grasp the irons as before, with thumbs downward; while in this position inflate the lungs fully, and as you do so raise the shoulders as high as possible; then gradually lower the weight, at the same time gently exhaling. Care should be taken that the centre of the body be exactly in line with the centre of the machine.

C. Loosen the thumb-screw on top of the arm, and adjust the shoulder-pads so that one will come on top edge of the right or left shoulder, and the other near the neck; attempt to raise the weight in this position.

Weight. — 25, 50, 75, 100, 125, 150, 175, 200.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Rest *minutes* after each movement (after 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Number 8.

A. Take a position on the platform. Place the feet on the foot-rest, and grasp the handles ; straighten the knees forcibly, and then allow the platform to return to its original position.

B. Position as in **A**. Straighten the knees, and, as the platform returns to the bottom of the slide, raise the left leg in air, keeping the leg straight, so that the right leg alone bears the weight.

C. Reverse of **B**, left leg bearing the weight, and right leg raised in air.

Weight. — $2\frac{1}{2}$, 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20.

Times. — 25, 35, 45, 55, 65, 75, 85, 95, 105, 115, 125, 135, 145, 155, 165, 175, 185, 195, 200.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Rest *minutes* after each movement (after 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Numbers 9 and 28.

A. Face the weight-box, standing directly under the pulley. Grasp the bar at the extreme ends, and bring it down with both hands by the chin until the bar rests opposite the thighs, with arms straight at the sides.

B. Face the weight-box, as in **A**, but standing two feet (from the centre) nearer the apparatus. Grasp the bar with hands eighteen inches apart; bring down the bar, keeping the elbows stiff, until it rests opposite the thighs, with arms at sides, as before.

C. Position as in **A**. Bring the bar down by holding the arms straight, and bending the body, pivoting at the hips; then allow the bar to return to its first position; now lean backward, and bring the bar to the back of the neck.

Weight. — 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Numbers 37 and 39.

A. Stand on the foot-rest with ball of the feet, heels resting on the floor; grasp the bars shoulder-high, and raise the weight on the toes.

B. Stand on the foot-rest, and grasp the bars shoulder-high; lean backward till the arms are extended; then lunge forward, keeping the elbows down towards the sides.

C. Face the wall, with feet on the foot-rest, and grasp the bars shoulder-high; now swing to the left until the left bar is opposite the centre of the body, then to the right until the right bar is opposite the centre of the body, to the left again, etc.

Numbers 10 and 27.

A. Face the apparatus. Grasp the bar with hands about ten inches apart, thumbs under, and wrists over; bring the bar down to the full extent of the arms; keep it as near the body as possible, with head erect, and shoulders thrown back; as the bar rises again, inflate the lungs slowly, and fill to their utmost capacity; hold the breath, and bring the bar down again, etc.

B. Grasp the bar with hands eighteen inches apart, thumbs to the front, and fingers over (undergrasp); bring the bar down to a level with the neck, arms bent; allow it to return, and repeat.

Weight. — 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Times. — 10, 12, 15, 17, 20, 22, 25, 27, 30, 50, 75, 100, 125, 150, 175, 200.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

✓ **Numbers 11 and 26.**

A. Take a position immediately under the pulley, facing the apparatus. Grasp the handles, and bring them to the sides, with arms extended, elbows stiff; allow handles gradually to return, keeping arms extended at the side, and elbows straight, inflating the lungs slowly, so that they shall be filled to their full capacity when the hands are over the head; then hold the breath as you bring the hands to the sides, as above described.

B. Take a position under the pulley, as in **A**, but a little nearer the apparatus. Bend the body forward slowly, lowering the handles with arms straight, and sweeping them backward with circular movement, until they return to their original position. Repeat the movement as described.

C. Face the apparatus, standing three feet farther from the weight-box than in position **A**. Bend the body backward from the knees; then, keeping the arms straight, extend them sideways until they reach a horizontal plane.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30, $32\frac{1}{2}$, 35, $37\frac{1}{2}$, 40.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Rest *minutes* after each movement (after 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 movements), in reclining posture, before using any other apparatus.

Numbers 12 and 25.

A. Face the apparatus. Clasp the inner bar with the fingers, and the outer bar with the thumbs, the hand being above the bars; bring the bars together by pressure of the thumb and fingers only, and without exertion of the arm.

B. Face the apparatus. Grasp the inner bar with fingers underneath, and place the palm of the hand against the outer bar, thumbs underneath; then close the hand, bringing the bars together, using the muscles of the hand and forearm only, and not using the biceps.

C. Stand with the right side towards the apparatus. Place both hands under the bars, the thumb of the right hand being extended along the inner bar, and the thumb of the left hand along the outer bar; close and open the hand as before.

C'. The reverse of **C**, with left side towards the apparatus.

D. Grasp the instrument with left hand under, fingers on inner bar, and outer bar in the hollow between thumb and forefinger; right hand over, fingers on inner bar, and outer bar in the hollow between thumb and forefinger.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140.

Number 13.

A. Lie at full length, with back on the platform. Place the toes in the straps; grasp the bar with hands about twelve inches apart; draw the bar down until it is opposite the breast.

B. Position as in **A.** Bring the bar down by the face, close to the body, to full extent of the arms.

C. Position as in **A.** Grasp the bar with hands four inches apart, and sweep it down until it is opposite the thighs, keeping the arms as stiff as possible. The bar will thus perform nearly a semicircle.

D. Position as in **A.** Bring the bar down, as in **B**, to front of thighs; then extend the bar towards the toes, keeping the arms straight, and raising the body to a sitting posture; let the platform slide down to its original position, and continue as described.

E. Position as in **A.** Grasp the bar with hands twelve inches apart; inflate the lungs to their full extent; while holding the breath, draw the bar down to a position in front of the chest from two to ten times before exhaling. Rest and repeat.

Weight. — 30, 27½, 25, 22½, 20, 17½, 15, 12½, 10, 7½, 5, 0.

Times. — 5, 7, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Rest *minutes* after each movement (after 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Number 14.

A. Grasp the handles, and stand about three feet from the apparatus, with feet together, holding the handles vertical; draw them back alternately to the sides of the body.

B. Position as in **A**, handles held horizontally. Draw them alternately over the shoulders with a bent arm movement.

C. Stand with back to the apparatus, and about two feet from it. Grasp the handles, thumbs outward; bring the hands forward in a direct line, with bent arm movement.

D. Position as in **C**, with back to apparatus. Bring handles to shoulders in a vertical position; then strike upward and forward at an angle of forty-five degrees, keeping the back and legs rigidly straight.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Number 15.

A. Face the apparatus, standing about three feet from it. Grasp the handles, holding them in a vertical position, with thumbs up, and draw them alternately back to the sides of the body.

B. Grasp both handles, and turn right side to the apparatus. While in this posture, brace with the right leg, and draw the left hand across the body.

B'. Reverse of **B**, with left side to the apparatus.

C. Stand with right side to the apparatus, and with right foot braced against the bottom of the standard. Advance the left foot about thirty-six inches, and strike out with right hand to full extent of arm.

C'. Reverse of **C**, with left side to the apparatus.

Number 16.

A. Take a position facing the apparatus, and in a bracing attitude. Alternately pull handles to the shoulders, with elbows pointing outward.

B. Grasp the handles, standing about four feet away, facing the apparatus; bend knees and back to nearly a sitting posture; then draw handles over the head both together, extending the legs, and straightening the back.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Numbers 17 and 20.

A. Face the apparatus, standing about three feet away. Grasp the handles, and pull down, alternately with right and left hands, bending the knees with each downward movement, and turning the body partially around.

B. Stand with back to apparatus, heels touching the foot-board. Draw handles down to the full extent of the arms, holding them in front of the body, and with back of hands upward; let them rise to the chest, elbows outward; then press downward to an extended position, and repeat.

C. Stand with back to apparatus, as in **B.** Grasp handles above the head, throw the body forward, then sweep the arms forward and downward with a circular movement, keeping the elbows straight. Return to first position with bent arm movement, and continue as before.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30.

Times. — 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Numbers 18 and 19.

A. Grasp the handle with right hand, and stand about five feet away, with right side toward the apparatus; bring the right arm down across the chest, keeping the elbow straight, until you make a complete circle.

B. The reverse of **A**, with left arm and left side to apparatus.

C. Grasp the handle with right hand, and stand with back to apparatus, just left of the centre; carry the handle down forward, keeping the arm straight, until the handle reaches the side; then bend the arm, and bring the handle to a position above the shoulder, with extended arm; then continue as before.

D. The reverse of **C**, with left arm.

E. Stand with right side to apparatus. Grasp the handle with the right hand, step three feet to the left, and pull handle down to shoulder with bent arm.

F. The reverse of **E**, using left hand and arm instead of right.

Weight. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Number 21.

A. Grasp the handles, and stand about four feet from the apparatus; bend forward at the same time, assuming a sitting posture; now turn the hands palms upward, straighten the legs and back, and bring the handles, with bent arms, to a position over the shoulders.

B. Grasp the handles, and stand four feet from the apparatus; bend forward, with legs straight, pivoting at the hips only; then sweep the handles backward, keeping the arms straight, and bringing the body to an erect position, with chest and abdomen well forward.

Number 23.

A. Grasp the handles, and stand with both feet together, back to apparatus, so that the heels will just clear the stanchions; lift the handles to a position above the head, with arms extended, turning the handles at the same time, so that the ropes will pass by the shoulders.

B. Grasp the handles, and stand back to apparatus; lunge forward with right foot; at the same time bring the handles forward from the rear, with arms nearly straight, bracing firmly with the left leg. While in this position repeat the forward movement with the arms, keeping head back and chest forward.

C. The same as **B**, with left leg to the front.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30.

Times. — 5, 8, 10, 12, 15, 17, 20, 22, 25, 27, 30, 32, 35, 37, 40.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 5, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Rest *minutes* after each movement (after 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Numbers 29 and 30.

A. Recline with back on apparatus, and place the feet in straps. Grasp the bar with hands twelve inches apart; fill the lungs as completely as possible, hold the breath, and bring the bar, with arms held rigidly straight, to a position in front of the thighs; now exhale; take another breath as the bar goes upward, hold the breath, and bring the bar down, with arms extended as above.

B. Position as in **A.** Grasp the bar with thumbs outward, hands ten inches apart; bring bar down on the back of the neck, then come forward to an upright position and beyond.

C. Position as in **A.** Grasp the rope-handles attached to the bar, with little fingers next to the knots, and bring bar to back of neck. While in this position raise the body from the circle, pivoting at the hips only.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30, $32\frac{1}{2}$, 35, $37\frac{1}{2}$, 40.

Times. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Rest *minutes* after each movement (after 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Number 32.

Stand facing pillar. Place canvas cap on head; lift weight until it is no longer supported by attachments above; then try to balance shaft perpendicularly without allowing it to come in contact with surrounding wood work.

Weight. — 15, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Times. — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

Rate per minute. — 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120.

Number 45.

Sit in a chair about twenty inches from machine. Place the feet on the foot-rest, with toes under the straps, and knees bent at right angles; raise and lower the box-weight by flexing the feet. The weight may be increased by removing one or more iron balls from the projecting screw.

Number 46.

Sit in a chair about twenty four inches from the machine. Place the feet on the foot-rest, with toes under the straps, and knees slightly bent; then raise and lower the ball-weights by flexing the feet, keeping heels closely pressed against foot-rest. In using the machine do not allow the weights to be supported by the rope attachment, but keep them constantly under tension of the muscles.

Weight. — Increase the weight by rolling the balls toward the end of the projecting screw.

Times. — 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250.

Rate per minute. — 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90.

Numbers 34 and 43.

A. Face the apparatus. Grasp the centre of roller with both hands, fingers over, and thumbs under; turn the roller toward you.

B. Position as in **A**, with left hand over and thumb under, and right hand under with thumb over. Turn the roller toward you.

C. Position as in **A**, with right hand over and thumb under, and left hand under with thumb over. Turn toward you.

D. Position as in **A**, with both hands under, and thumbs over. Turn the roller toward you.

E. Position as in **A**, with both hands over, and thumbs under. Turn from you.

F. Position as in **A**, with right hand under, and thumb over. Turn from you.

G. Position as in **A**, with left hand under, and thumb over. Turn from you.

H. Position as in **A**, with both hands under, and thumbs over. Turn from you.

Weight. -- 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25.

Times. -- 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, up.

Movement. -- Very slow, slow, medium, fast, very fast.

Rate per minute. -- 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

Number 44.

A. Sit in chair, and extend right leg straight, with right foot in foot-rest; connect the rope on right side by hooking into ring back of foot-rest; turn foot to left side, keeping knee straight; return to place, and continue movement.

B. Position as in **A.** Connect rope on left side by hooking into ring back of foot-rest; turn foot to right side, keeping knee straight; return to place, and continue movement.

C. Sit in chair, and extend left leg straight, with left foot in foot-rest; connect rope on left side by hooking into ring back of foot-rest; turn foot to right side, keeping knee straight; return to place, and continue movement.

D. Position as in **C.** Connect rope on right side by hooking into ring back of foot-rest; turn foot to left side, knee straight; return to place, and continue movement.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25.

Times. — 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150.

Movement. — Very slow, slow, medium, fast, very fast.

Number 36.

A. Recline upon the apparatus, after having adjusted it at an angle of thirty degrees. Place your feet under the foot-rest, and grasp the bar, with hands twelve inches apart; bring the bar to the thighs, with arms partially bent; allow it to return, and repeat the movement.

B. Position same as in **A.** Grasp the bar, with hands twelve inches apart, and bring it down to the thighs, with arms held rigidly straight.

C. Position as in **A.** Grasp the knotted ropes, with thumbs next to the bar; come forward with body to a sitting posture, bringing the bar, at the same time, to the back of the neck.

D. Adjust the apparatus to an angle of ten degrees. Place the feet under the foot-rest, and the hands behind the head; raise yourself to a sitting position, bending at the hips only.

Weight.— $2\frac{1}{2}$, 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30.

Times.—5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.

Movement.—Very slow, slow, medium, fast, very fast.

Rate per minute.—8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Rest *minutes* after each movement (after 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus

Number 38.

A. Place the hooks of the bars over the fourth round of the ladder next to the wall, and place the other end of the bars on the third round of the ladder adjoining. Take a position between bars, facing the centre of the hall, and about a foot from the large vertical ladder. Now raise the weight to the full extent of the arms, then drop to floor; repeat this, then move the hands backward two inches, and raise the weight again, and drop to the floor; then back two more inches with hands, raise the weight as above, etc.

B. Take position between bars, facing the centre of the hall, about three feet from large vertical ladder; raise the weight on the arms, and while in this position lift the feet, with legs straight and without a swing, till you touch the first round above the bar.

B'. Position as in **B.** Touch the second round above the bar.

B''. Position as above. Touch the third round, etc.

C. Stand on bottom round of large vertical ladder with back to it; place the hands at the centre of the bars, with arms straight; then come forward with body until the shoulders are on a level with the hands; now extend the arms, and continue as before.

C'. Position as in **C.** Place the feet on *second* round, and continue as above.

C''. Position as in **C.** Place the feet on *third* round, and continue as above.

Times. — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22, 25.

Number 40.

A. Seat yourself in the apparatus, place the feet on the treadles, and let the elbows rest on the arms of the chair, grasping the ends with the hands; extend the right and left leg alternately.

A'. Position as in **A.** Extend both legs at the same time.

A''. Position as in **A.** Extend the left leg three times, then the right three; again the left: and so on.

A'''. Position as in **A.** Extend the left leg three times, allowing the leg at rest to remain in a bent position; extend the right three times: and so on.

A''''. Position as in **A.** Extend the left leg twice, then the right twice; and so on, allowing the leg at rest to remain extended.

A'''''. Position as in **A.** Slide down in the seat so that the pressure of the weight or resistance shall come upon the upper back and shoulders; now extend the right and left legs rapidly, allowing the knees to come nearly to the chest.

Weight. — 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80.

Times. — 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Rest *minutes* after each movement (after 2, 3, 4, 5, 6, 7, 8, 9, 10 movements), in reclining posture, before using any other apparatus.

Numbers 35 and 41.

A. Stand on the foot-piece, facing the apparatus. Hold the body rigidly straight, and lunge forward, grasping the bars shoulder-high, throwing out the chest, and extending the elbows at the sides; now push back to an upright position, releasing the grasp of the hands, and bringing them to the sides; lunge forward again as before.

B. Stand back to apparatus, two feet from foot-rest, with body held erect. Now fall back between the bars, and grasp them just as the shoulders pass through; pull the body back again vigorously, releasing the hands, and grasping the bars on the other side as the body passes through.

C. Stand facing the apparatus, with toes six inches from the foot-rest. Lunge forward, and grasp the bars about shoulder-high; then extend the arms forcibly, so as to bring the body to an erect position.

Number 42.

A. Face the apparatus, standing three feet away. Grasp the handle with right hand, thumbs downward, and turn slowly to the right, then back to the left, holding the arm rigidly straight.

A'. Position as in **A.** Grasp the handle with the left hand, thumb downward, and turn to the left, and back, holding the arm straight, etc.

Weight. — 0, $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{3}{4}$, 5, $6\frac{1}{4}$, $7\frac{1}{2}$, $8\frac{3}{4}$, 10.

Times. — 5, 7, 10, 12, 15, 17, 20, 22, 25, 27, 30, 40, 50, 60, 70, 80.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Number 47.

A. Face the apparatus, standing with feet about twenty inches apart. Grasp the vertical rod at the ends, with right hand above, and left below; while the arms are held straight, turn slowly to the right until the position of the bar is inverted.

A'. Position as in **A.** Grasp the bar with left hand above and thumbs toward the centre; turn slowly to the left, with arms straight, till bar is inverted.

B. Stand facing the apparatus, with feet together. Grasp the bar, with right hand above, and left below, thumbs toward the centre, and hands six inches from the ends of the bar; lean backward, and turn with straightened arms to vertical position.

B'. Position as in **B.** Grasp the bar with left hand above, and right below, thumbs toward the centre, and hands six inches from the ends of the bar; lean backward, and turn with straightened arms to vertical position.

Weight. — 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60.

Times. — 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 15, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

Rest *minutes* after each movement (after 2, 4, 6, 8, 10, 12, 14, 16 movements), in reclining posture, before using any other apparatus.

Numbers 48 and 57.

A. Take a seat on the stool, facing the pillar, about three feet away. Place the feet on the foot-rest, with heels on the lower bar, and toes under the upper bar; place hands behind head; keep body straight from the hips up; lean backward, pivoting at the hips, until the top of head nearly touches the floor; then return to sitting posture, and continue as before.

A'. Position same as in **A**, with hands on the hips. Lean backward until the body is in a horizontal position; then return to place, and continue as before.

A''. Position same as in **A**, with hands on edge of stool. Lean backward until the body is at an angle of forty-five degrees; then return to vertical position, and continue as before.

Times. — 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,

Number 53.

A. Place the left foot in the left shoe. Grasp the bars, and step as far back as possible without raising the weight attached to shoe, and allowing both legs to remain straight; now bring the left leg back eighteen inches to the rear of the right, keeping both legs straight throughout the movement.

A'. The reverse of **A**, using right leg instead of left.

B. Place the left foot in shoe. Swing the left leg back eighteen inches to the rear of right, bending the left leg, and straightening the right, every time the weight is raised.

B'. The reverse of **B**, using right foot in shoe instead of the left.

Number 54.

A. Stand with back to apparatus. Place the left foot in shoe, and step as far forward as possible without raising the weight; then swing the left leg forward twelve inches in front of the right foot, keeping both legs rigidly straight.

A'. Reverse of **A**, using right foot in shoe instead of left.

B. Position as in **A**. Movement the same, but with bended knees; left foot in the shoe.

B'. Position as in **A'**. Movement the same, but with bended knees; right foot in the shoe.

Weight. — 5, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 15, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50.

Number 55. ✓

A. Sit on the sliding-seat, with toes in straps. Slide well forward, and grasp handle well toward the end; throw back head and shoulders until handle nearly touches legs; straighten knees, and bring handle, with straight arms, over the knees; then, with bent arms, bring handle nearly to pit of stomach, keeping the body, after first throwing back head and shoulders, a little back of perpendicular.

B. Sit on the sliding-seat, with toes in straps. Slide forward, and grasp handle, and pull it nearly to pit of stomach; then keep legs comparatively straight; lean well forward until handle just passes toes; then bring handle back, with straight arms, to pit of stomach, leaning backward until the body is nearly horizontal.

C. Sit on sliding-seat, with toes in straps, hands on hips. Lean backward at an angle of forty-five degrees; then come to perpendicular. After a little practice, lean back till head touches floor, with hands clasped behind neck.

Weight. — 15, $17\frac{1}{2}$, 20, $22\frac{1}{2}$, 25, $27\frac{1}{2}$, 30, $32\frac{1}{2}$, 35, $37\frac{1}{2}$, 40, $42\frac{1}{2}$, 45, $47\frac{1}{2}$, 50, $52\frac{1}{2}$, 55, $57\frac{1}{2}$, 60.

Times. — 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48.

Rest *minutes* after each movement (after 3, 5, 8, 10, 13, 15, 18, 20, 22, 25, 27, 30 movements), in reclining posture, before using any other apparatus.

, **Number 56.**

A. Stand with toes against the cleats, facing the apparatus. Grasp the handle ten inches from the ring with the left hand, and the other end of the handle with the right hand; hold the body firm, bending the knees slightly; sweep the bar round to the left, turning the body at the same time.

A'. The reverse of **A**, with right hand next to the ring, and left hand near the end of handle.

B. Stand with back to the apparatus, about two feet from the rods. Grasp the handle with left hand ten inches from the ring, and the other end with the right hand; turn to the right by extending the left arm, and flexing the right arm.

Weight. — 6, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 15, $17\frac{1}{2}$, 20.

Times. — 10, 15, 20, 25, 30, 35, 40, 45, 50.

Movement. — Very slow, slow, medium, fast, very fast.

Rate per minute. — 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60.

JOHNS HOPKINS UNIVERSITY GYMNASIUM.

TRIAL CARD.

No. of Card, 576-

Name, F. M. Garrison —

Issued, Jan. 11, 1884

Returned,

Same Card re-issued,

Modified card, No. , issued

Book issued,

Date,

Use Vertical & Over

PRESCRIPTIONS.

DAILY RECORD

Date,	M.	T.	W.	T.	F.	S.
1. Prescribed Machine, No. <i>3</i>				<i>10</i>		
2. Prescribed Weights <i>5 - 12½</i>				<i>10</i>		
3. Prescribed Times <i>10 - 40</i>				<i>30</i>		
4. Result of Exercise.....				<i>5</i>		
Date,						
1. Prescribed Machine, No. <i>11</i>						
2. Prescribed Weights <i>5 - 12½</i>				<i>10</i>		
3. Prescribed Times <i>5 - 25</i>				<i>25</i>		
4. Result of Exercise.....				<i>5</i>		
Date,						
1. Prescribed Machine, No. <i>5</i>						
2. Prescribed Weights <i>15 - 35</i>						
3. Prescribed Times <i>15 - 50</i>						
4. Result of Exercise.....						
Date,						
1. Prescribed Machine, No. <i>53</i>						
2. Prescribed Weights <i>10 - 25</i>						
3. Prescribed Times <i>30 - 100</i>						
4. Result of Exercise.....						

Use Chest Weights 3-7½ lbs.

EXERCISE TAKEN.

REMARKS.

[illegible]

Run 8 - 16 laps daily. but slowly.

N. B.—The person receiving this card is desired to fill in the blanks in the DAILY RECORD COLUMN: by indicating 1.) the date of using a given machine; 2) the sum of the *weights* lifted; 3.) the number of *times* the weights were lifted, and 4.) the *result* of such exercise. Place the letter I., S., or E. in the space opposite 4, according as the work seems Insufficient, Sufficient, or Excessive. Note under the head of REMARKS any suggestions which may aid the Director in determining the proper amount of work for you on each machine prescribed to be used.

At the end of a fortnight from the date of first using the machines, return this card to the Director's Office: whereupon another Card, or a Handbook will be given you.

